Miscellaneous
Today’s Class

• Sign up for Final Project Presentation Slots
• Quiz on Friday
• Today’s Readings
  – “Guidelines for Effective Usage of Text Highlighting Techniques”, Strobelt et al.
“Guidelines for Effective Usage of Text Highlighting Techniques”, Strobelt, Oelke, Kwon, Schreck, Pfister, IEEE InfoVis 2015

Fig. 1: Text highlighting techniques are commonly used to mark text features in documents. In this excerpt of “Alice in wonderland” all occurrences of adjectives and adverbs derived from part-of-speech tagging are highlighted in bold font, while words with typical adjective/adverb endings are highlighted with yellow background.

Fig. 11: Example of combining techniques letter spacing and italics – according to our analysis this is not an effective combination for highlighting two equally important text features.
• Why highlight text?
  – Make sure Data Structures students read the instructions
  – Make sure the reviewers of my paper/proposal understand my most important contributions
  – Challenge: I can’t highlight everything!

• How/why/when do you take notes/highlight when reading?
  – Technology vs. Strategy?
  – How do you use/review your notes/highlighting?
• 9 commonly used highlighting techniques
  – How strong is the pop-out effect for each highlighting technique?
  – How much visual interference do the pairs of effects have with each other?
  – Provide guidelines for usage
• Interview NLP researchers (a target user group)
• Test effectiveness of technique
  – in isolation
  – when surrounded by distractors
  – In tasks requiring combination with another technique

<table>
<thead>
<tr>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Font color</td>
</tr>
<tr>
<td>Background color</td>
</tr>
<tr>
<td>Underlined</td>
</tr>
<tr>
<td>Font size</td>
</tr>
<tr>
<td>Font style</td>
</tr>
<tr>
<td>Font weight</td>
</tr>
<tr>
<td>Rectangular border</td>
</tr>
<tr>
<td>Spaced out font</td>
</tr>
<tr>
<td>Text shadow</td>
</tr>
<tr>
<td>Font family</td>
</tr>
<tr>
<td>CAPITALIZATION</td>
</tr>
<tr>
<td>Strike-through</td>
</tr>
<tr>
<td>* Blinking *</td>
</tr>
</tbody>
</table>
• Artificial text without semantics
• Required minimum screen size
• Mouse (not touchpad)
• Avoid learning curves & fatigue effect

• They screened for colorblind users…
  – But did they screen for dyslexia?
• Recommendations
  – What about the overall legibility of the text?
    (increased spacing seems destructive/disruptive!)
Dyslexie is a font that is altered in a way that lets people with dyslexia read better.

OpenDyslexic is a free typeface/font designed to mitigate some of the common reading errors caused by dyslexia. The typeface was created by Abelardo Gonzalez, who released it through an open-source license.[1] Like many dyslexia-intervention typefaces, most notably Dyslexie, OpenDyslexic adds to dyslexia research and is a reading aid, but it is not a cure for dyslexia.[2] The typeface includes regular, bold, italic, bold-italic, and monospaced font styles. In 2012, Gonzalez

• Interviewed experts and their use cases! Great!
• Doesn’t study understanding of text, just visual attention grabbing.
• Maybe surprising relative results conjunctive vs. disjunctive?
• Now curious about different colors
• Prefer techniques that are more than binary (on/off) instead have many values (e.g., color highlighting)
Today’s Class

• Sign up for Final Project Presentation Slots
• Quiz on Friday
• Today’s Readings
  – “Guidelines for Effective Usage of Text Highlighting Techniques”, Strobelt et al.

Fig. 1. **Left**: The top twelve overall most memorable visualizations from our experiment (most to least memorable from top left to bottom right).  **Middle**: The top twelve most memorable visualizations from our experiment when visualizations containing human recognizable cartoons or images are removed (most to least memorable from top left to bottom right).  **Right**: The twelve least memorable visualizations from our experiment (most to least memorable from top left to bottom right).
What Makes a Visualization Memorable?

• Related to:
  – What makes a visualization engaging?
  
  But not the same as:
  – What makes a visualization comprehensible?
  – What makes a visualization effective?

• Graph-type, color, aesthetics, context, & individual biases influence cognitive workload & retention

• Collected 2070 static visualizations
  – “scraped” many online data sources, could only do what was possible to automate, while avoiding duplicates, etc.
  – Annotated by undergrads who had taken a visualization course

• Categorized by type (area chart, bar chart, line graph, maps, diagrams, point plots, tables, etc.)

• Labeled by data-ink ratio & visual density

• Other labels: dimension (2D, 3D), single or multi-panel/combination, pictogram, time series, B&W/# of distinct colors, human recognizable objects

What Makes a Visualization Memorable?”, Borkin, Vo, Bylinskii, Isola, Sunkavalli, Oliva, & Pfister, INFOVIS 2013
Multi-panel visualizations are necessary when explaining a concept or story (esp. when standing alone w/o an article)

Scientific publications have lots of diagrams

News & government use lots of bar charts & other common charts. Government uses lots of circle charts.

Tree & network diagrams only appear in scientific & infographic publications. Grid & matrices primarily scientific.

---

**Fig. 2.** Breakdown of visualization categories by visualization sources based on 2,070 single, static visualizations.
H.1 Participants will perform worse (i.e., overall have a harder time remembering visualizations) as compared to natural images/photos.

H.2 A visualization is more memorable if it includes a pictogram or cartoon of a recognizable image.

H.3 A visualization is more memorable if there is more color.

H.4 A visualization is more memorable if it has low visual density.

H.5 A visualization is more memorable if it is more “minimalist” (i.e., “good” data-ink ratio).

H.6 A visualization is more memorable if it includes a “familiar” visualization type (i.e., basic graph type taught in school).

H.7 A visualization is less memorable if it comes from a scientific publication venue.
• Selected ~400 visualizations
• Had 261 Mechanical Turk users play a memory game: watch a sequence of visualizations, press a key if you see a visualization repeat
• Subjects were paid for each “level” of the memory game they completed. Each level had 120 images and took ~ 5 minutes to complete. Image shown for 1 second, 1.4 second blank screen before next image appears
• Lots of checks to make sure Turks were skilled and taking the task seriously

What Makes a Visualization Memorable?, Borkin, Vo, Bylinskii, Isola, Sunkavalli, Oliva, & Pfister, INFOVIS 2013
Top Ten: Infographic

What Makes a Visualization Memorable?”, Borkin, Vo, Bylinskii, Isola, Sunkavalli, Oliva, & Pfister, INFOVIS 2013
Top Ten: News Media

What Makes a Visualization Memorable?”, Borkin, Vo, Bylinskii, Isola, Sunkavalli, Oliva, & Pfister, INFOVIS 2013
Top Ten: Scientific Publications

What Makes a Visualization Memorable?”, Borkin, Vo, Bylinskii, Isola, Sunkavalli, Oliva, & Pfister, INFOVIS 2013
Top Ten: Government/World Organization

What Makes a Visualization Memorable?”, Borkin, Vo, Bylinskii, Isola, Sunkavalli, Oliva, & Pfister, INFOVIS 2013
Visualizations were more memorable with:

- Pictograms
- Low data-to-ink, high visual density (more chart junk & clutter)
- Lots of color (at least 7 colors)
- Unique visualizations (e.g. diagrams) [vs. common visualizations (e.g. bar charts)]
- Grid/matrix, trees & networks
- Natural objects “Natural looking” (??)
- Round edges/circles
- Scientific & infographic (content or source author?) [government & world organization visualizations]

What Makes a Visualization Memorable?”, Borkin, Vo, Bylinskii, Isola, Sunkavalli, Oliva, & Pfister, INFOVIS 2013
• Some visualizations are specifically and carefully designed to be engaging, eye-catching, and memorable (Visualization vs. Advertising?)

• Some sources of visualization are required to conform to the source’s overall presentation style (thus lacks uniqueness)

• Visualization creators don’t just want a visualization to be memorable, they need the purpose of the visualization to be memorable.

• Future work
  – Want to do more fine-grained study of memorability
  – Break into subcategories
Today’s Class

• Sign up for Final Project Presentation Slots
• Quiz on Friday
• Today’s Readings
  – “Guidelines for Effective Usage of Text Highlighting Techniques”, Strobelt et al.